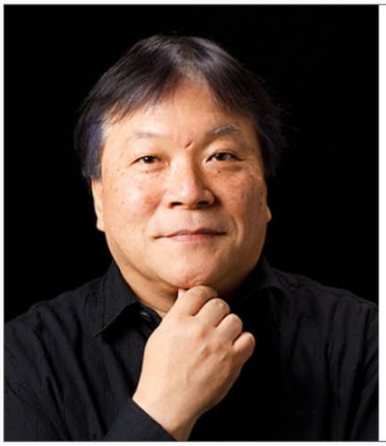


Principal Investigator

The University of Tokyo **Takuzo Aida**

Adopted Theme

Establishing the Technological and Commercial Foundations for Supramolecular Plastics

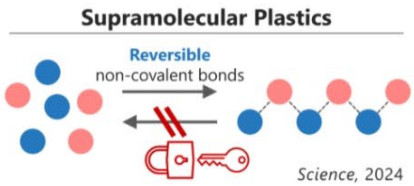
Subject of Research

Establishing the Technological and Commercial Foundations for Supramolecular Plastics

GTIE VC Collective

UTokyo Innovation Platform Co., Ltd.

Overview



- Cationic and anionic monomers assemble into polymers via non-covalent interactions
- Introduce a novel **"molecular lock"** that stabilizes reversible bonds, **achieving practical mechanical performance** comparable to conventional plastics
- The lock can be released simply by adding salt, enabling **full depolymerization into monomers**

Approximately 430 million tons of plastic are produced globally each year, yet a large portion is not recycled and ultimately leaks into the environment, causing serious issues such as microplastic pollution. Against this backdrop, growing demands from consumers and investors for environmentally responsible materials, along with tightening regulations worldwide, have made the transition to sustainable alternatives an urgent priority for global companies.
This project aims to advance the social implementation of an innovative new material—supramolecular plastics—that uniquely combine practical mechanical performance, biodegradability, and full recyclability. Supramolecular plastics rapidly dissociate into biodegradable monomers upon the addition of salt, preventing the generation of microplastics even if they enter the natural environment. The recovered monomers can then be re-synthesized to produce plastics of virgin quality, enabling repeated recycling while maintaining material performance
Through this initiative, we seek to establish both the technological and commercialization foundations necessary to launch a startup that will contribute to the realization of a sustainable plastics economy.

Business Models (when applying)

The project promotes the market introduction of supramolecular plastics through collaboration with brand-owner companies that play a key role in material selection within consumer product value chains. By conducting validation projects to evaluate application suitability and scalability, we will collaborate with partners across the value chain—including material producers and downstream partners—to accelerate the real-world adoption of this technology.

Activity Planning (when applying)

During the GTIE Gap Fund program, the project will advance research and development alongside business development to support the social implementation of supramolecular plastics. On the R&D side, we will optimize material properties and processability to develop material designs suitable for practical applications, while also exploring manufacturing processes and demonstrating recycling technologies to establish key technological foundations for commercialization.
In parallel, business development activities will focus on collaborating with companies in Japan and abroad to validate potential applications and explore partnerships across the supply chain. Through these efforts, we aim to progressively reduce both technological and business risks and ultimately establish a startup following the completion of the Gap Fund program.